IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Yuasa, et al.

Serial No.: 10/787,222

Filed: 2/27/2004

Title: POSITIVE ELECTRODE MATERIAL, ITS MANUFACTURING METHOD AND LITHIUM SECONDARY BATTERY

Art Unit: 1745

Examiner: Crepeau, J.

Conf. No.: 4833

SUPPLEMENTAL RESPONSE

Mail Stop: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450 July 23, 2010
Sir:

This response is supplemental to the Amendment After Final Rejection Under 37 CFR 1.116 filed March 23, 2010 and is being filed within the suspension period requested in the Request for Continued Examination filed April 23, 2010.

Applicants conducted a charge/discharge test using the lithium secondary battery of the present invention in a low temperature environment, i.e., at -30ºC and results are shown in Table 1 on page 12 of Applicants' specification.

The Matsumoto et al. publication discloses a test for measuring discharge capacity of a single particle of secondary $LiCoO_2$ particles using dry air of dew point -60ºC, but does not disclose any charge/discharge test using a lithium secondary battery in a low temperature environment, i.e., at -30ºC.

The Nakano et al. publication discloses a charge/discharge test using a lithium secondary battery in the environment of a temperature of 60ºC, which is the upper limit of the temperature range for use of a lithium secondary battery.

The Shiozaki et al. publication discloses a charge/discharge test using a lithium secondary battery but is silent about the temperature condition of the test.

The advisory action alleges:

> The Matsumoto publication is deemed to fairly suggest the 10-70% limitation (Feature 2) and the Shiozaki publication teaches the composition of the primary particles.
> It is submitted that these references have been properly combined, and applicants have not shown evidence of secondary considerations such as unexpected results to rebut the rejection under 35 U.S.C. 103.

The Matsumoto et al. publication fails to teach explicitly the 10-70% limitation of the present invention. Even assuming, arguendo, that the publication suggests the 10-70% limitation, one of ordinary skill in the art would not have any reason to combine the Matsumoto et al. publication and the Shiozaki et al. publication, since the composition of the primary particle of Masumoto et al. is represented as $LiCoO_2$,which is different from that of Shiozaki et al.

Moreover, even from the combination of Matsumoto et al. and Shiozaki et al., the advantageous results of the discharge rate characteristic and the battery capacity in the low temperature environment of -30ºC would not have been expected.

The final office action contends that "the artisan would be motivated by these teachings by Matsumoto: JP '951 to manufacture the secondary particles such that relatively large portions of the surface of the primary particles are touching each other." This contention is traversed. One skilled in the art would not be motivated by these teachings (by Matsumoto et al.) to manufacture the secondary particles of the present invention, since the composition of the secondary particle of Matsumoto

et al. is different from that of the present invention and further, Matsumoto et al. fails to teach the unexpected results of the discharge rate characteristic and the battery capacity in the low temperature environment of -30ºC.

The Office Action also contends that the artisan would be motivated to use $Li_xMn_aNi_bCo_cO_2$ composition of WO '881 as the active material of JP '951. This contention is also traversed. However, while WO '881 and JP '951 teach a high energy density and an excellent charging/discharging cycle performance, they fail to teach the unexpected results of the discharge rate characteristic and battery capacity in the low temperature environment of -30ºC.

On page 4 of the final office action, it is contended that Nakano et al. teaches a positive electrode material comprising a lithium composite oxide in the form of primary particles flocculated into secondary particles, and the secondary particle has a voidage of 30% or less, preferably 10-20%. On page 5 of the final Office Action, it is further contended that the artisan would be motivated to use the voidage disclosed by JP '006 Nakano et al. in the secondary particle of JP '951 Matsumoto et al. These contentions are traversed. The composition of the primary particle of Nakano et al. is represented as $Li_{x-y}A_yNi_{1-Z}MO_2$ ($0 \leq z \leq 0.5$) and the content of Ni thereof would be more than 50%. On the other hand, the composition of the primary particle of Matsumoto et al. is represented as $LiCoO_2$, which is different from that Nakano et al. Accordingly, the composition of the secondary particle of Matsumoto et al. is different from that of Nakano et al. One of ordinary skill in the art would not have been motivated to use the voidage disclosed by Nakano et al. in the secondary particle of JP '951 Matsumoto et al. in order to achieve an excellent cycle characteristic in the low temperature environment of -30ºC, since the composition of the secondary particle of Masumoto et al. is different from that of Nakano et al. and further, Nakano et al. and Matsumoto et al. fail to teach the unexpected results of

the discharge rate characteristic and the battery capacity in the low temperature environment of -30ºC.

For the foregoing reasons, the presently claimed invention is patentable over the proposed combination of Matsumoto et al., Shiozaki et al. and Nakano et al.

In view of the foregoing remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 1021.43559X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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